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AN EXPERIMENTAL STUDY OF BELIEF¹

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The object of the present study is to describe, in analytical terms, the experience of Belief, as it appeared under experimental conditions. Although a good deal has been written, by psychologists, upon the subject of Belief, it is not too much to say that the status of the experience is still very uncertain, and its place in the system of psychology undetermined. A brief historical review will suffice for the support of this statement.

Perhaps the first writer to give an empirical psychological criterion of Belief is David Hume. Belief or Assent is the vivacity of the perceptions presented by memory and the senses, the force and liveliness of these perceptions; it is a strong and steady conception of any idea (*A Treatise of Human Nature*, ed. by L. A. Selby-Bigge, 1888, 86, 97 n, 101, 103, 116, 119); it is the manner of our conceiving ideas which bestows on them an additional force and vivacity (96). An Opinion or Belief is a lively idea related to or associated with a present impression (96, 93, 97, 98, 209, 626); the relation is due to custom (102, 626), and the Belief arises only from causation (107; cf. 113). The vivacity proceeding from a customary conjunction with a present impression is an ultimate character of ideas (636, 629); that of the historical narration, *e. g.*, is more forcible and real than that of poetry (631).

According to James Mill, Belief is an inseparable association. "In every instance of Belief, there is indissoluble association of the ideas . . . Cases of indissoluble association, admitted by all men to be this, and nothing more, are acknowledged as Belief" (*Analysis of the Phenomena of the Human Mind*, i., 1869, 368 f.). Here is the

¹ From the Psychological Laboratory of Cornell University.

one side of the Humian doctrine. According to John Stuart Mill, Belief is more than an inseparable association (*ibid.*, 418). "What is the difference to *our minds* between thinking of a reality, and representing to ourselves an imaginary picture? I confess that I can perceive no escape from the opinion that the distinction is ultimate and primordial. There is no more difficulty in holding it to be so, than in holding the difference between a sensation and an idea to be primordial. It seems almost another aspect of the same difference. . . . Grant these differences, and there is nothing further to explain in the phenomenon of Belief" (412 f., 419 ff.). Here is the other side of the Humian doctrine, though its statement is less concrete than in the pages of Hume himself.

Alexander Bain finds "the first germ and perennial substance" of Belief in what he terms primitive credulity: "we begin by believing everything; whatever is, is true." "We may, if we please, call it an impotence of thought; for, without some positive interference from without, there is no other way of doing or thinking." Belief as a specific experience "is distinguished when we suffer the shock of a contradiction, a check or disappointment in some career of activity." This Belief, an "innate credulity tempered by checks," is influenced by various factors, intellectual, emotional and active. Logically, it is opposed to disbelief; "but as a mental fact these two states are identical The real opposite of Belief as a state of mind is not disbelief, but doubt, uncertainty." What precisely "the state of mind called Belief, expectation, confidence, trust, assurance, conviction" is, in psychological terms, Bain does not tell us; it involves intellect, but knowledge is not the whole of it; it is often accompanied by strong emotion, yet emotion does not amount to believing. Since "preparedness to act upon what we affirm is admitted on all hands to be the sole, the genuine, the unmistakable criterion of Belief," it is clear that Belief is a mode of will; it has its germ, as we have seen, in the primitive tendency to accept whatever has not yet been contradicted; at the same time, the working of this primordial impulse would not of itself have led to any mention or differentiation of Belief; there is a necessary intellectual element,—some cognisance of the order of nature, or of the course of the world. In a word, Bain gives us a genetic account of Belief, tracing its sources, constituents and dependences in general terms; but he does not offer us an analysis of the actual experience of Belief (*The Emotions and the Will*, 1880, 505 ff.). The most important features of this account are, first, the insistence on the naturalness or nativeness of Belief, the mind's instinctive tendency to accept, so that the thing to be explained in psychology is rather doubt or obstructed belief than Belief itself; and, secondly, the couching of a theory of Belief in 'motor' terms. These two features do not appear to be necessarily connected.

Herbert Spencer follows James Mill in reducing Belief to an indissoluble association (*Principles of Psychology*, i., 1881, 421; ii., 406 ff., 505*hh-ii*). Franz Brentano, on the other hand, accepts and recasts the doctrine of John Mill. "Nach unserer Ausdrucksweise ist seine Lehre die, dass Vorstellen und Urtheilen zwei völlig verschiedene Arten der Beziehung auf einen Inhalt, zwei grundverschiedene Weisen des Bewusstseins von einem Gegenstande seien" (*Psychologie vom empirischen Standpunkte*, i., 1874, 275). Neither of these authors helps us towards a psychological analysis.

So far we have found Belief described as an elementary process or function of mind, and as a complex intellectual or volitional formation. The affective interpretation has not either been wanting. It

has, indeed, been ascribed to Hume himself, on the basis of the following passage: "The difference between fiction and Belief lies in some sentiment or feeling, which is annexed to the latter, not to the former" (*An Enquiry Concerning Human Understanding*, Religion of Science Library, 1900, 48). It is clear, however, from other passages, that Hume's doctrine of Belief in the *Enquiry* is in substance identical with that of the *Treatise*: what characterises Belief is not so much a 'feeling' as a 'feel' (48 ff., 112; cf. W. B. Elkin, *Hume*, 1904, 172 ff.). W. James, on the other hand, declares that "in its inner nature Belief, or the sense of reality, is a sort of feeling more allied to the emotions than to anything else;" "Belief consists in an emotional reaction of the entire man on an object." At the same time, he thinks that it resists further analysis: "Belief, the sense of reality, feels like itself—that is about as much as we can say;" "this attitude is a state of consciousness *sui generis*, about which nothing more can be said in the way of internal analysis." James agrees with Bain that the true opposites of Belief, psychologically considered, are doubt and inquiry, not disbelief, and that the primitive impulse is to affirm immediately the reality of all that is conceived. He agrees, also, that Belief is closely connected with motor activity: "motor effects are apt to follow;" "consent and Belief are both intimately connected with subsequent practical activity" (*Principles of Psychology*, ii., 1890, 283 ff.). We need not here follow James into his discussion of the conditions of Belief. We note that W. Bagehot speaks explicitly of Belief as an emotion, the emotion of conviction (*Literary Studies*, i., 1879, 412 ff.).

Three other modern psychologists—J. Sully, J. M. Baldwin, G. F. Stout—call for mention in this connection. According to Sully, Belief is a compound of three factors: intellectual representation, feeling, and active impulse. Intellectually regarded, Belief "marks off the objective attitude of ideation or thought, or, in other words, the fact of its representativeness." Affectively regarded, Belief is "the state or feeling of restful assurance, which is always present in some degree when we judge or decide upon a matter, and which gives to our judgment its characteristic psychical coloring." Again, Belief stands in organic connection with action; Belief and activity react the one upon the other. "In most cases, at any rate, Belief involves the incipient excitation of impulses to look out for a result, and to follow a line of action" (*The Human Mind*, i., 1892, 453 f., 483 ff.; ii., 276 ff.; *Sensation and Intuition*, 1880, 75 ff.).

Belief, as a specific mental state or process, is treated by Baldwin in his *Handbook of Psychology*, ii., 1891, *Feeling and Will*. "The feeling of Belief is a feeling which attaches to the representative faculty primarily." "It is a feeling of confirmation and security over and above the feeling of simple reality;" "Belief in anything is the consciousness of the presence of that thing as fitted to satisfy a need; and it is distinguished from the earlier unreflecting reality-feeling, which is the simple consciousness of a presence;" Belief is "a feeling arising from the successful outgo of impulse." Baldwin regards this feeling as *sui generis*: "as a feeling, Belief cannot be explained any more than any other feeling; it must be felt; further remarks are really upon the physiological and psychical conditions under which this feeling arises" (155 ff.).

Stout uses the term Belief in a wide sense as interchangeable with judgment, and regards it as an attitude of consciousness towards its object, fundamentally distinct from simple apprehension; in this position he follows Brentano (*Analytic Psychology*, i., 1896, 96 ff., 115; ii., 234 ff.).

In Titchener's *Outline of Psychology*, 1896, 315 f., Belief is given a place among the intellectual sentiments, and a method of investigation is proposed. The passage runs as follows:

"The intellectual sentiments might be investigated in the following way. Prepare a number of reasoned statements—or select them from the lists given in the text-books of formal logic—some of which are correct, while others contain various logical fallacies. Let the subject give a careful introspective account of the 'feelings' aroused by their reading. . . . A rough notion of the number and forms of the intellectual sentiments can be obtained by introspection of consciousness during the reading of a piece of scientific reasoning, or the hearing of a scientific lecture."

Here is evidently a suggestion of the experimental method which has recently been widely used in the investigation of the processes of thought. We ourselves employed the method in two forms: as a method of single exposures, and as a method of paired comparisons. We prepared a long list of sentences, with a view to the arousal, in the mind of the observer, of belief, disbelief or doubt; the sentences were made as short as possible, in order to avoid unnecessary complications in understanding, and were selected with an eye to the interests and attainments of the observers. Series were also taken in which the sentences were replaced by mathematical expressions. These four principal experiments will be reported separately.

A long series of preliminary observations was made by Professors Titchener and Bentley. Sentences, calculated to arouse belief or disbelief, were typewritten at the head of sheets of paper, and the observers were instructed to read with understanding, to note the appearance of belief or disbelief, and if either of these consciousnesses occurred to write a full introspective account of the experience. No limit of time was set for the understanding, and no record was taken of the time required for the appearance of belief or disbelief; the object of the observations was a purely qualitative analysis. The tests showed, in general, that there is a definite consciousness which is unhesitatingly recognised and named as belief or disbelief, and is distinguished from mere assent, or passive acceptance, but that this consciousness is of comparatively rare occurrence. It was surprising, both to the experimenter and to the observers, that sentences which seemed likely to arouse a strong response, of belief or disbelief, were taken coolly and passively; the observers were 'ready' to believe, knew that the analysis of belief was the 'problem' before them, and nevertheless found, in the great majority of cases, that the sentences were accepted or dismissed as if automatically, or that they were met with an indifferent suspense of judgment. We may say at once that a like difficulty,

though of less degree, was encountered in all the regular observations. It may, no doubt, be ascribed in good part to the nature of the stimuli employed,—detached sentences, laid before the observers apart from any context or cumulative argument. At the same time, if casual but long-continued observation by the experimenter and others may be trusted, a distinctive belief-consciousness is not of common occurrence in everyday life. This statement, however, necessarily remains vague until we have given a detailed analysis of that consciousness.

METHOD OF SINGLE EXPOSURES: SENTENCES, VISUAL

In this first series of experiments, the observer, seated comfortably at a table, was shown a typewritten statement, and was instructed to read it with concentrated attention, to note whether it aroused belief or disbelief, and on the appearance of either consciousness to close his eyes and to dictate to the experimenter a full account of the experience. In a certain number of cases the introspective record was fractionated: that is, in some observations the period covered extended only to the understanding of the sentence, in others it began with the understanding and ended with a clearly formed belief or disbelief; we have not thought it necessary, however, to give these fractionated results a separate treatment. No time records were taken. The regular observers were Miss A. de Vries (V), a graduate student in psychology; Miss H. Clarke (C), fellow in psychology; Dr. L. R. Geissler (G), instructor in psychology; and Mr. W. S. Foster (F), assistant in psychology in Cornell University. Less numerous observations were made by two other students, Mrs. Piotrowska (P) and Mr. Clarke (Cl).

It should be said that all four of the regular observers had taken part, in the previous year, in a Seminary discussion of the experimental investigation of the thought-processes. They were therefore familiar with the method employed, with its limitations and dangers, and were especially alive to the difference between informatory report and psychological description. Largely for this reason, questioning by the experimenter was ordinarily unnecessary, and was in fact very sparingly used. Recourse was had to it only when the observer was obviously reporting in verbal shorthand, and even then it was made as little suggestive as possible; in particular, no hint was given that certain processes were wanted or expected by the experimenter, and no limit was set to the observer's vocabulary. There was, of course, a good deal of *Kundgabe* in the records at large, and we were content to let it stand as such; only as regards the consciousness of Belief

proper were we at great pains to translate the *Kundgabe*, where it occurred, into *Beschreibung*. Belief and disbelief were, as has been said, the strict topic of our analytical inquiry.

In order to deal effectively with the great bulk of introspective material, we take up the observers in order, give a brief characterisation of their mental constitution, and then state the results of their analysis. Selections from the introspective records are appended as evidence. The numbers prefixed to the general statements correspond to those prefixed, later, to the selected introspections. Samples of the sentences employed will be found at the end of this paper.

Observer V

With this observer we made 196 successful tests. *V* is of an impartially imaginal type, (1) and is especially liable to empathic kinaesthesia, sensory and imaginal. It is interesting, as an item of individual psychology, that verbal images were of comparatively rare occurrence, and that they occurred always with disbelief, never with belief. Belief and disbelief are characterised by a fairly intensive affective process, (2) which is almost always pleasant; the pleasantness appears as well with disbelief as with belief. The most important and characteristic factor in the belief-disbelief consciousness was an organic (mainly kinaesthetic) complex, which stood out clearly and sharply from the other contents of the moment. (3*a*) Slowing and deepening of breathing, with attendant change of sensation, were frequently reported. There were also (3*b*) kinaesthetic sensations from a shift of bodily attitude, from sitting up and straightening in the chair. With strong belief or disbelief there was (3*c*) a 'feeling of power' or 'feeling of superiority;' the whole body felt as if stiffened into something massive and strong.

V had a personal interest in the experiments, and took the 'problem' very seriously. Possibly for this reason she showed a type of reaction which was not found with the other observers; (4) as soon as the sentence was read, there was a belief-disbelief consciousness of an indefinite kind; then the sentence was re-read, with a view to complete understanding, or to verification of the previous understanding; and then, finally, belief-disbelief emerged in definite form, and in stronger or weaker degree as the case might be. When the decision had been taken, and belief or disbelief established, (5) the aggressive attitude changed to a relaxation of muscular strain, with the emotion of relief.

(1) A 131. Imaginary image of a Chinese in the water. Felt choked, as if I were drowning. A 126. Visual image of a trick ele-

phant dancing. Felt big and clumsy myself, as if I were the elephant.

(2) A 59. Decided I did not believe it. Pleasant. A 81. There was no hesitation about understanding it and coming to this conclusion. Pleasant. A 58. Rejected the whole statement as unsafe. Don't believe it. Decisive. Pleasant. A 125. The feeling of disbelief was definite, clear, like a streak of yellow color or the call of a trumpet. Felt pleasant. A 60. Decided in an instant that I disbelieved it. Pleasant. A 102. Verbal saying over to myself: Of course don't believe it. Satisfaction. A 11. The feeling that I was right in not believing it . . . was pleasant. A 88. Clear verbal ideas: There's something wrong; it isn't a good comparison. That was pleasant.

(3a) A 3. Believed it. . . Sensations from deep breathing. A 10. Sensations from slow breathing. . . Believed it. A 125. Felt strong, and sensations from deep breathing. (Disbelief.) A 58. Sensation from sitting up, and long breathing. (Disbelief.)

(3b) A 60. Straightened up. (Disbelief.) A 11. Sensations from frowning and sitting up; felt tightening of jaw and strain of arms. Disagreed with everything in the statement. A 17. Sensations from straightening up, and I knew I did not believe it. A 56. Belief strengthened the more I read it. Felt sure I was right. Sensations from sitting up straight.

(3c) A 11. Felt aggressive. (Disbelief.) A 58, A 125, etc. Felt strong. A 12. Knew I believed it. Felt satisfied and rather superior, as if my decision were surely right. A 29. Belief came suddenly and was certain. Felt I was right in believing it. Pleasant, and felt strong and cool. A 32. Believed this part. Pleasant, and warm sensations up and down the spine. Rejected all the rest as a mass of useless words. Felt superior.

(4) A 77. Read and understood; did not believe it. [Then follows a stage of thought, given mainly in attitudinal terms.] Then I knew why I disbelieved the sentence, and felt satisfied. A 7. Read sentence and had clear auditory after-images. Decided at once that I believed it. This was very pleasant. [Then follows a stage of doubt and deliberation.] Decided I had been right in believing it. Felt pleasant. A 24. Read it once and knew I would never believe it. [Then follows a stage of consideration.] Felt superior; sensations of straightening up and of deep breathing; sensations also from skin of face around the mouth. Then rejected the whole thing at once.

(5) A 7. Muscles all relaxed. A 21. Felt relaxation when I decided. A 60. Felt relief. A 1. This I do believe, and when this was decided I relaxed. A 10. Relaxed all over. A 11. At the end, my muscles were all relaxed and I sighed in relief. A 12. As I became sure I had kinæsthetic sensations from nodding, and relaxed.

Observer C

With this observer we made 218 successful tests. *C* is an excellent visualiser, and less impartial in type than *V*. (1) Almost all her reports contained descriptions of visual imagery, sometimes vague and schematic, sometimes sharp and clear. (2) The reaction of belief-disbelief was usually affective; but the affective processes were less intensive than for *V*, and were often qualified by a 'rather' or 'slightly.' With very few exceptions, the experience of belief was pleasant, that of disbelief

unpleasant. (3) Organic sensations were seldom reported, and were not intensive. (4) The most important and characteristic factor in the belief-disbelief consciousness was a 'perception' of agreement or disagreement, of harmony or disharmony, which was difficult to analyse, but seemed in every case to be preponderantly visual. (5) This 'perception' was clinched and expressed in verbal form; with belief came the verbal ideas 'Yes,' 'That is true,' etc., and with disbelief the verbal ideas 'No,' 'It isn't true,' etc. Internal speech, overt or abbreviated, was very common.

(1) A 59. Meaning was perfectly clear and was illustrated at every step by what might be called symbolic visual images. The whole thought was thus objectified. E 1. The word natural was attended by the visual image of the outside of Max Müller's book on Natural Religion. . . . In connection with first part of sentence, visual image of a savage on the seashore. . . . There was also a schematic representation of a savage as related to other members of his society. This was mostly a matter of geometrical lines with the savage himself in an angle, and was too vague to be definitely described. E 2. Very clear visual images of the whole incident described. Saw the child in the schoolroom, even having a vague idea of his place in the room, and followed him to the store which was definitely located in reference to the room. . . . There was also an image of the man who answered at the other end of the telephone. A 129. Visual image of a page of Spencer's Data of Ethics with the paragraph marks which he uses. E 9. An imaginative image of the infant being brought into the room and the change of expression in his face. Then memory images of babies I have known, especially one. . . . The image of the real baby changed somewhat to agree with my memory of him at different times, and was set upon a sort of dissolving background, now his own home, now a room in his grandmother's house. The latter was quite distinct and definite. There was a background to the imaginative images too, a room, part of which I could describe rather definitely. Here, however, there was no tendency to change; the image was about as static as a visual perception and remains so yet.

(2) A 11. Assent was accompanied by a feeling of pleasure. A 7. The assent in this case was accompanied by an agreeable feeling, what might be called a feeling of satisfaction. A 12. The assent was accompanied by a pleasurable feeling and amusement. A 56. I assented to the proposition and the feeling was slightly agreeable. E 3. Disbelief. . . . Attitude of dissatisfaction.

(3) E 3. Negation at every step accompanied by unpleasantly unsettled organic sensations. A 59. Feeling of strain in the eyes and holding the breath. [Reports of this degree of definiteness were very rare.]

(4) E 9. Conscious attitude of lack of agreement with my experience. I don't know what this was. It was a certain visual blankness in part; I found no corresponding fact in my experience. E 6. Visual images of Rousseau as I have always imagined him, not as he looks in his picture. Visual image of several people in a wood, representing my idea of Rousseau's return to nature. These were both imaginative images originally, but have long represented these ideas to me, and are in a sense memory images now. I was aware that the statement agreed with what I knew of Rousseau. It is hard to tell what this agreement was; it seemed to lie in the images. E 5. Visual image of

the outside of a book that I once read on a related subject. Schematic representation of opinions that I have read or held about the question. I seemed to see a long and broad trench about as wide as a street, and the opinions were in some way localised there. A consciousness of agreement between them and the sentence; this seemed to belong to the visual representation of them. E 11. Visual image of one of Max Müller's books with his name on the outside. A series of visual images that represented his theory to me when I first read it. Feeling of amusement at the incongruity of the statement just read with the general trend of Max Müller's theories. Then a very distinct image of people inventing language through action, as I perceived it when read. Idea, vaguely verbal, that there was less contradiction here. There was more in this than words. I think the two ideas seemed spatially closer than in the other case, though only one of them was represented by a distinct image.

(5) E 1. Verbal image: This is only relative. E 2. Verbal image: It may be true. E 4. Verbal image: Imageless thought. E 7. Verbal image: Of course a deaf-mute has concepts. A 12. I said: Yes, especially from the standpoint of structural psychology. E 3. Verbal image: Not every one. E 9. Verbal image: May be true; I don't know. A 129. Verbal images: Believe Spencer said it; not so sure it's true. A 22. Said: I don't know; and then: Probable. A 59. Said the word Analogy. . . Gave a partial assent in the words: It is probable.

Observer G

With this observer we made 170 successful tests. *G* may be characterised as of the verbal-imageless type; in his ordinary thinking he makes no use of visual images, and though he is a skilled musician he has no mental furniture of auditory images; he thinks, if the phrase may be coined, in verbal awarenesses. Our own experiments, as well as other and similar experiments in which he has recently taken part, prove that he has, at least in some degree, the capacity for images, visual and auditory; "the assimilation of a new idea, or the understanding of a novel term, is for *G* a definitely imaginal experience, but with growing familiarity the images very quickly lapse."¹ We find, in fact, (1) that *G* occasionally reports imagery, though in this matter his introspections, as a whole, are in marked contrast to those of *V* and *C*. Almost invariably (2) he reports internal speech: sometimes in the form of properly formulated sentences, usually in what *G* terms 'shorthand,' a more or less abbreviated and schematic representation.² The verbal images Yes, No, and Nonsense were the commonest. (3) Organic sensations are not a marked feature of *G*'s consciousness. (4)

¹Titchener: *Experimental Psychology of the Thought-processes*, 1909, 248.

²The verbal shorthand consisted, in general, of an intermittent pressure of the tongue against the palate, and of the setting of the organs of speech for the articulation of initial consonants. *G* will publish, in another place, a full introspective account of this mode of verbal ideation.

He is, throughout this series of experiments, reluctant to identify belief either with verbal imagery or with kinæsthesia; he seeks to give it a formal explanation, as an Herbartian apperception, or a Wundtian assimilation; he speaks of the 'fusion' of the statement with memory ideas, and of a 'conflict of meanings'; yet he fails to find any conscious contents aside from the words and the kinæsthesia; belief is beaten up with these experiences, as in the case of *C* it is with the visual images. (5) The affective side of the experience is fairly strong; with a few exceptions, which can be explained, belief is pleasant and disbelief unpleasant. While, as we have said, belief was not attended by any pronounced kinæsthetic or other organic complex, the presence of muscular tension is shown (6) by the frequent report of an emotion of relief after assent has been given or withheld.

(1) A 5. At the same time vague memory idea, illustrating this principle, of an automobile localised in vague visual terms in front of the Armory, where I frequently have seen them backing up or trying to turn round. I don't know why I should call these images visual, because I don't see anything, but somehow, whether by habit or imitation, I refer them to some strain in the muscles of the eyeball. Anyhow, the images are so vague that they might just as well be entirely kinæsthetic.¹ A 126. Vague visual image, when I closed my eyes, of a gray mass, vaguely of the shape of an elephant, and then another visual image, a triangular shaped, whitish image corresponding to a circus tent. A 90. Visually, in very vague images, I saw myself in the Acoustics Room, where all my experiments have been done. A 9. The word 'expression' was accompanied by a visual image of a picture of an actress, seen in my room just before I left the house. A 87. I had vague image of Professor Titchener in the Seminary Room and of his situation, and vague auditory image of his voice. A 10. Very vague and indefinite picture of battle with soldiers charging and getting wounded. Now attention seemed directed to man lying wounded in the foreground. . . . Now a man slightly wounded arose and began to attack.

(2) A 114. My reaction towards this statement was mostly in verbal form; I had a strong muscular tendency to say aloud: Oh, that is nonsense. The words: Oh, nonsense, are one of my habitual reactions to statements that strike me as absurd. A 116. In more or less abbreviated verbal form the question arose in me: How can movement direct the trend of thought? . . . The words: strain, attitude, kinæsthetics, sounded in my ears. A 58. The refusal to accept was accompanied by motor tendency to habitual expression: Aha! A 101. While visually reading there was verbal comment in the background. This consisted in slight innervations of the throat and back of the mouth for the expressions What is that? That is absurd, Nonsense, No. A 77. Had abbreviated verbal comment, which if written out would be: Intelligent persons are not always white men, and more pressure does not mean more power. A 126. That is disbelief, because verbal comment ran: Implies reasoning in animals, which doesn't exist. A 84. Brentano's name came up (internal speech).

¹ Cf. the analysis of the memory image given by C. W. Perky, this *Journal*, xxi. 1910, 450.

. . . At once the thought struck me: This is a very empty phrase if you take it literally, and there is no danger of getting into trouble if you accept it: this thought was not so elaborate in consciousness, but occurred in the usual shorthand verbal fashion.—Reports of this sort are as common as those of the former sort are rare.

(3) A 101. Reread the whole statement and had a slight kinæsthetic tendency to shake my head. A 58. Empty, blank consciousness . . . was simply absence of ideas, while a slight organic or kinæsthetic background was present.—More than once *G* reports 'a tendency to smile and say: That is nonsense; the tendency to smile was mostly kinæsthetic or motor tension in the face, and especially around the eyes.' Often the report is given: 'I did not notice any kinæsthetic or organic processes.'

(4) A 3. As soon as the whole phrase fused or associated with the idea that this means, in other words, that the whole world is a total mental process, then agreement was established with a strongly pleasant relief noticeable also in the body and in change of position. In this case the attitude was markedly kinæsthetic, and not a mere association of ideas. A 78. When I got as far as the word Kicking (in reading the first time) my left foot (the left leg being crossed over the right) started more or less unconsciously a quite marked upward movement and caused a host of kinæsthetic strain and muscular sensations. This concrete example (whether merely coincidence or not) or illustration of the statement made the acceptance of its truth easy and pleasant, although as a rule I am very sceptical with regard to motor tendencies. But this concrete example convinced me quite strongly that the state of acceptance or belief is mostly a fusion of new ideas with memory ideas. In this particular case it was a fusion (or coincidence) of a new idea with a homogeneous perception. By homogeneous I mean a perception of the same content as the ideated content. A 79. Disbelief, because there is a host of verbal objections, verbally more or less articulated objections. I don't know how to describe it otherwise than as a conflict of meanings. These conflicting meanings arise already during reading, and become focal after I get through reading. I can't analyse these meanings. They attach themselves to verbal articulations. The conflict itself can't either be analysed; it is too complicated. A 19. Disbelief came especially in the word: Meek. There was a conflict. . . . Conflict in meaning arises in verbal ideas which have opposite meanings, whatever that is; for instance, Meek suggests Strong, and I prefer Strong to Meek.

Once the conflict is given in affective terms. A 84. There seemed to be a quick change from slight unpleasantness (going with the meaningfulness of the statement) to slight pleasantness in accepting it without risking anything.—Several times reference is made to a quick alternation of exemplifying ideas, given in verbal terms. 'These ideas were very vague and flash-like and quick, with almost no content.'

Sometimes the absence of conflict appears to condition belief. A 9. No images to the contrary arose, so the sentence was accepted silently, with a slightly pleasant feeling. A 21. Acceptance seemed to consist in the absence of any conflict between the statement and associative ideas. I cannot describe what the conflict would be like.

The 'fusion of new ideas with memory ideas' appears in many reports from this observer. A 90. There was a slight tendency to accept the statement on account of the ease with which memory ideas occur and fuse with the statement as read. I cannot say what is the form of the memory ideas; just a background of attitude. A 87. I am somewhat doubtful of the last phrase, because I haven't images

enough to illustrate my understanding of it. In other words, the last phrase does not call up images of any kind, with which it could fuse. [On question, the images expected were said to be verbal.] A 22. Very vague memory image of newspaper statement; I don't know what kind it was. I think the memory image fuses with the statement, and that is the acceptance. A 10. Acceptation came in fairly definitely and with moderately pleasant feeling, since the conflict of ideas gave way to the fusion of them.—As to the nature of the fusion, we get a hint, not in the case of the 'new ideas and memory ideas,' but in that of the memory ideas themselves. A 9. The word *Beauty* was accompanied by a vague background of a host of ideas (verbal-motor in terms) fused together like the tones of the same chord played by different hands in different octaves on the piano. [This analogy would come readily to a highly musical observer.]

(5) A 90. Slight belief. . . This was slightly pleasantly tinged. A 22. Slight pleasantness, may be due to the fusion or assimilation. A 9. Accepted with a slight pleasant feeling. . . Unpleasant feeling accompanied the clash of different [verbal] images aroused by the different parts of the sentence. A 77. Not true absolutely, but may be true on the average. . . The whole state was slightly unpleasant.

Wherever disbelief was pleasant, the pleasantness was of a humorous nature, and found expression in a smile. A 60. At once the reaction set in, expressed by the phrase: That is nonsense, with smile of humor, and pleasantness.

(6) A 3. Agreement was established with a strong pleasant relief. A 13. Belief concludes with a slight pleasantness and a feeling of relief as if from muscular strain. I don't know what muscular strain there was.

Observer F

With this observer we made 187 successful tests. The analysis of belief-disbelief was simple and straightforward: the consciousness consisted (1) of verbal ideas, or (2) of kinæsthetic expression, or of both these factors together. Belief was characterised (3) by a peculiar organic sensation. Only occasionally was reference made (4) to affective processes.

(1) A 133. Acceptance came as: Yes. Also I found in myself a tendency to nod my head for acceptance, and to say again 'yes, that's right.' Acceptance is certainly, in this method of experiment, bound up with verbal ideas. E 7. I thought: Yes, that sounds O K. . . The belief was essentially the Yes. A 6. My acceptance was a verbal one, principally; I thought: That's all right. A 120. Disbelief. . . Tendency to say: It does [fluctuate]; it may be strong or weak. B 3. I thought: Yes—always. Belief was nothing more than the meaning [of the sentence] and the words thought. . . Belief came again; it was the meaning and a nod of the head. . . Belief came a third time, when meaning of whole was grasped, and was verbal: Yes, that's true.

(2) A 133, B 3, as above. Reports of nodding and shaking the head were very common.

(3) The organic complex was at first indescribable. A 6. Something unanalysable and faint; probably organic sensation; at least I can't think of it as anything else. [Later on it was described.] A 132. There has been in my case also a very faint, very obscure and uncertain organic sensation, coming from just below the ribs a little to the left of the centre. I have mentioned this before but have not described

it, because I was not certain of its nature. [The complex felt like a long narrow slip of pressure. It was not an invariable constituent of the belief-consciousness, but it was reported as constitutive where it appeared, and it appeared frequently with different methods. There is only one suggestion of anything similar in the case of disbelief. A 123. Failure to accept appears to me to be in this case mainly a 'feeling of unwillingness' or 'feeling of inability' to say the thing is true. But I am sure that the inhibition of speech is not all: something organic?]

(4) A 6. Belief. . . . Feeling was pleasant, and like the feeling of familiarity, if not identical with it. A 120. Feeling of dissatisfaction, both with the statement and with the author of it.—These affective reactions were very rare.

Observers Cl and P

With the observer *Cl* we made 48, and with *P* 24 tests. The numbers are too small for a final analysis; but we may note a few points of interest in the introspective reports.

The observers are of radically different types. *Cl* is pronouncedly visual, even more so than *C* (the observers, though of the same name, are not related). The understanding of the sentences consisted in the arousal of complex visual imagery, and *Cl* repeatedly said (1) that he could not distinguish understanding from believing; belief was given, at once, with the clear visual images. Disbelief came, not at once, but as a result (2) of the incongruity of the images, which was felt rather than perceived. Both belief and disbelief were intrinsically pleasant; if disbelief was unpleasant, there was a special reason for the change of affective process.

P was of the same type as *G*, and spoke always of belief and disbelief as a fitting-in with or contradiction of pre-existing ideas; the experiments ceased before she was able (3) to analyse this attitude. For *P*, too, belief and disbelief were both intrinsically pleasant.

(1) B 4. Understanding and belief were very closely connected. As soon as I had passed the words 'typhoid fever' I understood and believed. A 135. I am not sure just where the dividing interval between understanding and belief lay, or if there is any such interval. . . . I think that the instant I clearly understood the sentence, I also believed it. A 133. Understanding and belief were simultaneous.

(2) The following instances serve to illustrate the observer's wealth of visual imagery, as well as the fact that disbelief depends on their incongruity. B 2. I had a series of visual images, corresponding to cat, house, garden, a second cat, etc., and put them together piece by piece as in a picture until I had, as it were, a series of pictures,—first the cat alone on the background, then the bones alone, then the cat carrying the bones, etc. The whole scene, except the second cat, was familiar. The word 'benevolent' called up a picture of a clergyman acquaintance, and the introduction of this incongruous person aroused my sense of humor and I had a tendency to smile. . . . The idea of benevolence in that connection was so incongruous that I refused to accept it. A 125. I recalled from memory a fornicarium, but this immediately disappeared, and I imagined the ants as on the table

before me: several of them, scattered over a space perhaps six inches square, were blue or yellow, and were warning off another ant, black, who ran about wildly, and tried to get inside the space. Then the ridiculousness and impossibility of such a scene struck me, and I decided that I did not believe it.

(3) *P* speaks, in general terms, of 'satisfaction at the fitting in of the words to the unformulated content of my mind,' of 'a feeling of disagreement and a tendency to argue in opposition,' of 'something there out of harmony with my own views,' etc. Here we have clean-cut instances of *Kundgabe* as opposed to psychological *Beschreibung*. Neither *Cl* nor *P* had had the general introspective practice of the previous observers, and the present experiments were, as we have said, too few to give positive results. Nevertheless, *P*, who is of the imageless type, is content with a form of words that conveys meaning but fails to describe, while *Cl* is saved from this substitution of logic for psychology by his strongly visual type. It is doubtful, however, if *Cl* is reporting a belief-consciousness that is on the same level with that of the previous observers; the identification of clear understanding with belief reminds us rather of Bain's primitive credulity.

It may be added, in illustration of type, that the observer *Cl* has schematic visual images which carry the meanings of belief and doubt. These images came out very clearly in the later experiments by the method of paired comparisons. C 14. In reading these two, I visualised a small stone sphere, like a marble, next to a larger, more irregular, but generally spherical body like a sponge, the latter being above the former. . . . In all these cases the marble represents the more concrete and the more easily understood sentence, the sponge the other.—In reply to questions about these images, *Cl* reported that belief was always represented, for him, by a circle or a ball, of small size, two or three feet away from the eyes, which is very sharp in outline and seems very heavy. Doubt or hesitant belief may be represented by a larger, softer, vague, indefinite and hazy ball. The schematic image for doubt is, however, less constant than that for belief. It may be replaced by other, more pictorial images. B 4. In cases of hesitation I often get a visual image of some familiar country road, one cross-road appearing more often than the others. This picture disappears when the sentence has aroused visual images of its meaning. B 16. I had the impression of being surrounded by a gray mist, which I could enter, but in which I was absolutely lost. C 13. I took the attitude that here was something definite which I had better accept, while my own definition was rather vague and I had not cleared things up. I visualised this as a person standing on a gangway above the water [the clear definition], while near by on the water floated a mass of wreckage or pieces of wood [*Cl*'s own previous ideas].

METHOD OF SINGLE EXPOSURES: MATHEMATICAL EXPRESSIONS, VISUAL

In this series of experiments we sought to analyse simple forms of the consciousness of certainty or uncertainty. Problems in arithmetic and algebra, of an easy kind, were type-written on slips of paper. Sometimes no solution was given. The observer was then instructed to read the problem, to solve it mentally, and to introspect the consciousness of certainty or uncertainty which accompanied his result. Sometimes the answer was printed on the same slip; it was covered, at the

beginning of the experiment, by a blank sheet. The observer was then instructed, either to read the problem, to look at the answer, and to verify its correctness by mental computation; or to read the problem, to solve it mentally, and after solution to compare his own answer with that given on the slip; in both cases he was to report upon the resulting consciousness of certainty or uncertainty. A full series of experiments was performed with the observer *C*; brief series were taken with *V*, *G* and *F*.

Observer C

With this observer we made 150 tests. (1) The problems were worked out in visual terms; as a rule, the visual images were clear and definite. (2) The reaction of certainty-uncertainty was more intensively affective than that of belief-disbelief in the preceding experiments; certainty was invariably pleasant, uncertainty unpleasant. (3) Kinæsthetic sensations were more strongly in evidence than in the former experiments, though they are still not a marked or uniform feature of consciousness. (4) The most important and characteristic feature of the certainty-uncertainty consciousness was a visual perception of agreement or disagreement. (5) This perception was clinched and expressed in verbal form.

(1) A 123. I added the numbers as they came with clear visual images of the series. . . . The images were so clear that I could not have been much more sure if I had seen the scale before me and counted them out upon it. A 121. I used the visual method. . . . The visual images were not clear, and the number that I was to add would sometimes disappear or get mixed with others. A 119. I read the problem and worked it mentally three times, using visual images. A 113. In the first part I had images of the numbers written under one another and proceeded as in ordinary subtraction. In the last part I had an image of the series as numbers on a line marking off distance, with specially large marks at each hundred and smaller ones at the tens. . . . I did all the work by means of visual images.

(2) A 123. Affective mood pleasant. A 113. Slightly pleasant feeling; attitude of satisfaction. A 67. The whole process was agreeable. A 121. Uncomfortable feeling; dissatisfaction. . . . Pleasurable feeling connected with the agreement. A 112. Very unpleasant. A 71. There was something unsatisfactory and displeasing about the result.

(3) A 121. Strain in eyes and forehead. . . . Relaxation of strain [with later agreement]. A 71. Muscular strain about face. A 111. Sensations of strain in the eyes. A 119. Feeling of strain in eyes and forehead. Slight tendency to move the eyes as I followed the imaginary line from 100 to 28. Relaxation accompanied certainty. A 114. Organic sensations from breathing; strain in the forehead and eyes. (Uncertainty.) A 110. Feeling of certainty. . . . I breathed more easily; the strain in the eyes is gone.

(4) A 123. I had a high degree of certainty that my answer was right the first time, due I think to the clearness of the visual images and the ease with which they fitted into each other. A 121. I had a

vague image of my numbers on the visual line overlapping or failing partly to meet. I was in doubt about the correctness of my answer. A 136. I was fairly certain of the answer the first time because each separate addition had been clear cut and had itself carried certainty. It is hard to say just what I mean by this. I think the visual image had most to do with it. When I am certain I am right, I can see very definitely to what point on my visual scale the series reaches; when I am not certain, it is less clear, and seems to overlap several points. A 137. Each step was clear and definite in consciousness and was accompanied by a feeling of certainty. This may be described as visual agreement. Each step of the process seemed to fit into the scale and to leave no doubt.

(5) A 113. Verbal images: Second was right. A 112. Verbal images: First probably right. A 110. Verbal image: Mistake? A 114. Verbal images: This is right. A 115. Verbal images: No use to do it again; this is right.—The phrases: First right, Second right, Where's the mistake? etc., were very common.

Loss of interest. It is worth noting that, as soon as the consciousness of certainty had formed, the observer fell into a specific attitude, which she designated 'loss of interest.' A 136. I lost interest in the problem and had no desire to do it again. A 115. Loss of interest in the problem and difficulty in keeping the attention on it any longer. A 118. Loss of interest in the problem. A 117. The problem lost interest. My attitude might be called a feeling that it was of no use to try it again as the answer would certainly be the same.—We have had no opportunity of subjecting this attitude to analysis. Its main feature appears to be a motor relaxation and restlessness, corresponding to lapse of voluntary attention.

Observer V

With this observer we made 50 tests. We found, as before, kinæsthetic and other organic sensations of an empathic kind, and we found (1) that complexes of organic sensations were the essential factor of the certainty-uncertainty consciousness. (2) Certainty and uncertainty are characterised by a fairly intensive affective process, pleasant for certainty and unpleasant for uncertainty. It is, again, interesting to note that verbal images (aside from the names of the symbols) were not once reported. (3) The work is usually done in visual terms.

(1) A 116. A host of organic sensations; pressure on the chest especially. . . The feeling of certainty was distinct: I felt strong and sat up straight. A 120. Many organic sensations in chest, arms and back. Sat up, breathed deep. Had a sense of power. (Certainty.) A 136. Felt certain. . . Got sense of power and superiority. A 144. Feeling of certainty. Organic sensations and usual feeling of power. A 140. Feeling of uncertainty: heavy pressure in chest and arms, felt tired, breathing difficult, frowned. A 142. Feeling that I could not trust myself: sensations of pressure in chest and back, felt tired. A 118. Feeling of helplessness; no certainty at all; creepy feeling in back, and pressure in chest and stomach; felt tired. A 143. A feeling of uncertainty. Mostly organic sensations of pressure in different parts of the body; felt chilly. A 117. At first uncertainty: shivery, prickly sensations in arms. Then certainty: sat up straight. Feeling of safety, which I can't analyse, but I think breathing had most to do with it.

(2) A 119. Pleasant. Sat up, breathed deep, felt satisfied. A 136. Felt certain. . . Restful and pleasant. A 141. Very pleasant and restful. A 140. (Second stage.) Decided feeling of certainty and elation. . . Had feeling of power and satisfaction. A 139. No certainty. . . Very unpleasant. A 142. (See above.) Rather unpleasant.

(3) A 139. Visualised but kept forgetting. A 142. Visualised, but the figures moved; unsteady. A 120. Visualised and did it that way; very easy. A 140. Visualised and made it more easy by moving my pencil in the air as I worked.

Observers F and G

With these observers we made only 20 tests. The following introspections supplement and confirm those already cited under Belief.

F. A 66. Certainty this time seems to be a sensation in back of neck which comes when I nod my head; also an organic sensation located near the place where the organic sensation of belief is, and much like it. A 115. Nodded my head. . . Organic sensation in lower chest, which seemed to be a feeling of 'I thought so' or 'Just as I thought.'—Verbal ideas, of the kind already quoted, were very common. The experience was more definitely affective than in the previous experiments; certainty was pleasant, uncertainty unpleasant.

G. A 141. Distinct feeling of relief with long expiration (must have been holding my breath while computing); said aloud: Yes. Bodily position was changed in relief; straightened out. A 117. Feeling of certainty very strong, expressed itself immediately in the spoken sentence: This must be right. Pronounced pleasantness, and muscular tension in face, as if inhibiting a faint smile. A 142. I was sure (I don't know how to analyse it) that my calculation was right. . . The whole task was verbal, auditory-motor.—Internal speech (or spoken words) and the subsequent emotion of relief are again characteristic of this observer.

METHOD OF SINGLE EXPOSURES: AUDITORY

At the conclusion of the visual series, we made experiments in which sentences or mathematical expressions were read aloud to the observers by the experimenter. The observers were *C*, *V*, *F* and *G*; about 60 tests were made with each one. The introspections of *C*, *F* and *G* show no new features, and we therefore do not quote from them. We have, however, certain reports from *V* which are worth quotation, as they seem to throw light upon the analytical psychology of suggestion (religious conversion, etc.).

B 2. A flash of belief came at this moment. Seems to take hold of me and envelop me. I felt light and airy, cool, rested and relaxed. The sense of belief is not an intellectual thing. The reasoning comes first, and after the actual reasoning process is concluded the rush of belief comes with almost physical force. I feel that I believe, and the thought or idea of what I believe is not present at all. The belief in its momentary flash is not referable to any object. B 1. Then came a feeling of belief. It seemed to come upon me from

outside and envelop me like a gust of wind or a flash of light. I sat straight, felt refreshed and relieved and satisfied. B 4. I came through this [reasoning process] and stopped and believed. As soon as I believed, I forgot everything. Sat up straight, breathed deeply, felt strong. Pleasant. B 7. Then I had a decided disbelief, very clear and definite. It seemed to come from the outside. I had kinæsthetic sensations from straightening up, and organic sensations from long breathing, and I had a feeling of superiority. B 11. Disbelief came on me as a strong wind from the outside.

Several reports of Doubt were obtained in this series. B 8. Then understood and felt doubt, with sensations in chest, frowning, heavy feeling in arms. B 9. Doubt, as organic sensations in chest and arms, turning head and squinting of eyes; breathed with difficulty. Unpleasant.

METHOD OF PAIRED COMPARISONS: SENTENCES, VISUAL

Our observers were now trained to the fulfillment of the *Aufgabe* or problem of the experiments, and instances of belief were becoming far more common than they were at the beginning. We thought, however, that the method of single exposures could yield no further results of importance, and we feared that the introspections might take on a stereotyped form. Hence we had recourse to a method of paired comparisons. Sentences, so chosen as to evoke belief and disbelief, were typewritten upon slips of paper. The observer was instructed to read them, to note the appearance of belief or disbelief or both, and then to report introspectively upon the belief and disbelief consciousnesses. The regular observers were *V*, *C* and *F*; a few observations were also made by *G*.

Observer V

With this observer we made 246 successful tests. We need not again illustrate *V*'s tendency to empathic kinæsthesia. We note that belief and disbelief are characterised (1) by a fairly intensive affective process; if the belief and disbelief are strong, the affective accompaniment is almost always pleasant for both; if they are weak or but moderately strong, both consciousnesses show a ratio of pleasantness to unpleasantness of approximately 8 : 5. There is no trace of any regular distribution of the affective processes, pleasantness to belief and unpleasantness to disbelief. Doubt, however, is always unpleasant. (2) The most important factor in the belief-disbelief consciousness is an organic (mainly kinæsthetic) complex, the nature of which is shown in the following quotations.

(3) *V* again showed the threefold type of reaction: belief-disbelief, deliberation and verification, belief-disbelief once more. When decision had been taken, (4) there was muscular relaxation and the emotion of relief.

(1) C 13a. Clear, strong and pleasant belief. C 15b. Belief grew till it was maximally vivid, strong and pleasant. C 17b. Disbelief strong and clear. Interesting; . . . felt amused and smiled. C 14b. Belief very pleasant. C 20a. Belief was strong and pleasant. C 20b. Disbelief was strong. . . Feeling pleasant. C 59b. Got an amused but decided disbelief. . . Pleasant; smiled. F 4a. Got at once clear, strong disbelief. . . Felt disagreeable, cross and impatient. F 10b. (Disbelief.) This was pleasant, and disbelief differed from the belief of the other sentence only in its name.

(2) The 'feeling of power' was frequently reported in connection with belief and disbelief. C 41a. Strong tendency to disbelief. . . Felt strong. C 48b. Strong and decided disbelief. Felt superior and rather cross. Felt like pounding the table. F 2b. Believed it. Organic sensations of power, with deep breathing. F 11b. (Disbelief.) I had the organic sensations of power that meant I was sure my decision was right. C 22a. Strong feeling of power. Intense belief. C 9b. Disbelief. . . A sort of amused, lenient but decided sense of power. C 1b. Decided disbelief. Felt supercilious and haughty. F 25b. The feeling of disbelief was quite sure, and I had the feeling of power. [On question from the experimenter, the observer declared that she could find no psychological difference between belief and disbelief.]

In most cases, the 'feeling of power' was connected with the perception of straightening up in the chair. F 22a. Feeling of power and strength; sat up straight; deep breathing. F 14a. Frowned; held my breath. . . Felt sense of power; sat up straight. (Disbelief.) F 14b. Clear, intense belief. Sat up, smiled, felt strong. F 10a. This certainty of being right is carried by organic sensations of power. I sat up, smiled, breathed deep, puffed my chest out. C 49a. Disbelief. . . Took breath, sat up, and felt sense of power. C 29a. Felt superior, sat up straight, smiled. Disbelief clear. C 13a. Clear, strong . . . belief. . . Sat up, breathed deep, and had sense of power; satisfaction. C 20b. Disbelief. . . Felt haughty, and had sense of strength. Sat up straight.

Sometimes, however, organic sensations are reported without reference to this 'feeling.' F 25a. (Belief.) Organic sensations and motor image of nodding my head. Strong breathing and sensations from diaphragm. Kinæsthetic image of sitting up. F 19a. Intense belief. . . Organic sensations and kinæsthetic images of sitting up straight. F 13a. Belief . . . is clear and intense (deep breathing, sitting up straight, etc.). C 28a. Decided sense of belief . . . Felt satisfied, sighed, leaned back in chair. D 10a. Felt sure and satisfied. Sensations from sitting up. F 7b. Belief at once . . . I nodded my head, sat up straight, breathed easily, and felt comfortable.

Change of breathing is especially frequent with strong belief or disbelief. F 14b. Clear intense belief. . . Breathed easily. F 5b. Belief is clear . . . Long easy breathing. F 2b. Believed it . . . Deep breathing.

In the following instance of strong belief the 'feeling of power' is identified with kinæsthetic attitude. F 27b. Kinæsthetic image of nodding the head very hard. I had feeling of activity. Feeling of activity or feeling of power means sitting up, deep breathing, and all the other muscular and organic sensations that I have mentioned.

Nodding and shaking the head are fairly often reported. F 27a. I got belief without getting meaning clear. It was simply a tendency to nod the head. F 5a. Feeling of acquiescence; nodded my head a little in faint acceptance. C 58a. Shook my head emphatically,

meaning: No. F 3b. Disbelief consisted in rigid muscular state, shaking the head, and sensation of drawing away from something. F 14a. Felt confused: frowned, held breath, shook head.

The organic sensation of tingling is peculiar to this observer. F 14b. Intense belief. Had tingling sensations all over me. F 20a. Especially tingling sensations in the spine, which I am likely to have with intense belief.

Strong disbelief is also evidenced by bodily stiffening and shrinking: *cf.* F 3b above. F 4a. Rigid muscles, with nervous movements of hands and feet; rapid breathing; drew back. F 6b. Shaking head in dissent; shrugging back with shoulders, twisting mouth, breathing out rapidly. F 1a. Sensations from breathing fast, with muscular strain especially in face; motor image of shaking head; stiffened and drew back. F 14a. Shook head. General muscular contraction; kinæsthetic image of stamping foot.

The 'feeling of power,' in its intense forms, is characterised as a feeling of aggressiveness. C 29b. Felt aggressive and rather angry . . . Felt actively opposed and displeased. Unpleasant, breathed fast, felt hot, frowned. C 8a. Felt a sense of power and aggression. Felt angry and grew hot. Disbelief very strong and decided.

Verbal ideas were infrequent.

(3) F 6a. Read it twice. . . Smiled, and got feeling of disbelief. [Stage of wonder and thought.] Felt that I was right, and the disbelief-sensations returned. F 12b. Intense belief at once. [Then stage of forced or voluntary deliberation.] Feel that I am right. F 14b. Intense belief. [Stage of consideration.] Belief was very intense and clear. F 19a. I got belief before I stopped to get meaning. [Consideration of meaning.] Satisfied I was right.

(4) C 14b. Belief . . . Calm and comfortable. I leaned back and felt rested. C 41a. (Disbelief.) Relief; felt rested and strong. C 45a. Belief . . . Felt amused and contented with myself. Felt rested. F 1b. (Belief.) Organic state peaceful. General feeling of muscular relaxation. F 5b. (Belief.) Restful relaxation of muscles. F 19a. Satisfied I was right (this consisted of muscular relaxation, and relief).

V used various adjectives to characterise her beliefs and disbeliefs. All of them may, according to her own subsequent report, be reduced to the two pairs strong-weak and clear-vague. 'Solid' and 'decided' were employed as synonymous with strong; 'distinct' and 'definite' as synonymous with clear. The intensity of belief varied with the intensity and massiveness (spatial distribution) of the kinæsthetic and other organic sensations with which the introspective records have made us familiar. The clearness or definiteness of belief depended, in logical terms, upon the relation of the statement to pre-existing knowledge. A belief was clear if it stood in associative connection with particular memories, which justified it. Usually, this relation, so far as it is conscious, is for the observer a kinæsthetic attitude; in the present experiments, a visual image (less frequently, a form of words) tended to replace the attitude. Sometimes, however, the clearness of the belief was kinæsthetic; so that we have the very curious fact of two kinæsthetic attitudes—those of

belief itself, and of the clearness or definiteness of belief—somehow combined, or superimposed the one upon the other. We regret that we have been unable, from lack of time, to trace this complexity further.

F 14b. (Belief was intense and also clear.) I knew why I believed, and this was what made it clear. Got visual image of philosophy class; this seemed to mean 'If religion is properly interpreted, it need not conflict with science at all.' F 7a. The clear element is what I call the logical element; I know why I disbelieve. The intensity of disbelief depends on the organic sensations, and on whether I feel I am justified or not [this 'feeling of justification' has been analysed in previous reports].—On question from the experimenter: The clear element came from memory of lessons in biology. I think I visualised the text-book. F 10ab. On reading first statement I had a sense of familiarity. Got successive visual images of the observatory at Vassar where I saw sun-spots, and of several people I knew. . . . Belief was clear because I knew why I believed it; had learned the fact in elementary astronomy. . . . The clearness of belief comes more from a logical, the intensity from a psychological process. . . . On reading second statement . . . I got immediately clear, strong disbelief. I had the sense of familiarity, and had visual image of a telescope, and of the moon as seen through it. . . . I knew why I did not believe it; I had been shown good proof of the impossibility of life on the moon. I felt (organically as before) that I was right.—On question from the experimenter: The clearness came with, or was attached to, the visual images. My sense of familiarity is usually kinæsthetic and organic, apart from the affection; I think these sensations were there too, but I didn't pay attention to them. F 26a. Then I got verbal association of some experiment done in a woman's college. . . . Then I was inclined to disbelieve. Disbelief was not intense, but quite clear I understood why I disbelieved. . . . Weak and intense belief differ only as regards intensity of kinæsthetic and organic sensations; they differ in degree. Intense belief can be more easily localised; strength of belief is muscular strength.

In the cases quoted, we find visual or verbal images that carry the clearness. The reason that the observer speaks of clearness of a 'logical' matter is that oftentimes a belief 'feels' clear, touches off the verbal report 'clear,' without there being anything in consciousness—or at least, anything discoverable by the present method—to serve as specific vehicle of the clearness. A clear belief is a belief which could be justified later, by explicit argument, if the observer were challenged to justify it. We are reminded of Störring's 'state of assurance,' which may apparently exist only as a physiological disposition.¹

Observer C

With this observer we made 225 successful tests. The most important feature of the belief-disbelief consciousness was, again, (1) a perception of visual agreement or disagreement, which (2) was clinched and expressed in verbal form. (3) Kinæsthetic sensations and organic sensations were more in evidence than in the first series of experiments, though they were still not a marked or uniform feature of consciousness.

¹ Cf. Titchener: *Thought-processes*, 1909, 289 f.

(4) Affective processes were neither frequent nor intensive; belief was pleasant, disbelief pleasant or unpleasant.

(1) F 14b. (Belief with reservations.) The belief and disbelief were carried partly by Yes and No. But the main thing was something visual; hard to describe. I had two long lines, moving parallel to each other: each one had branches, hitting those of the other. That was conflict; the main things did not conflict. C 42a. Belief. This is hard to describe. There were visual images, more or less fragmentary or schematic, representing peculiarities of poets, and these were somehow seen to agree with the statement. F 27ab. Belief in both cases. . . Visual image of adult, and then of child; reference to my own experience. That was a line representing the time from the present to the past; there was nothing more that I can tell. . . Memory of child was very plain, but scattered and disarranged; a visual pattern made up of bits, which were very clear, and which I could see very plainly; clear cut, and separate from one another. Memory of adult was like a spider's web, clear, all united. . . All this fitted in, in some way, with the reference to past experience; I believed; the two things fused together; but I can't say whether at this stage there was any representation of past experience.

Sometimes a visual schema for 'past experience' is reported. D 4a. I had visual images representing will, past experience, etc. . . . When I say I believed, I cannot say that there was anything in consciousness except the mere visual image representing the meaning of the sentence, which was seen to agree with the visual image of previous opinion. This latter was present at first as a dark, vague object in the visual field; after I began reporting, it translated itself into words. C 48a. There was something in consciousness which represented the interpretation of animal action in human terms. It is hard to say what it was. I am sure that it was in part at least visual, but I cannot describe the image. It seemed to agree with the statement; it was a visual perception of this agreement. C 7a. It is very hard to say in what this belief consists. I usually have a schematic visual representation, sometimes very vague, of previous opinions on the subject, and seem to see an agreement between that and the present sentence. The assent is partly verbal sometimes, often expressed by the one word Yes; but I am sure that this is not always present. D 9b. I believed the statement; but it is hard to say what this consisted of. I think it was mostly visual. My schema of feelings of familiarity was seen to coincide with that of the feelings named. C 2b. On reading I had a schematic visual image which represented evolution and progress to me. It was very vague and I can't describe it. I assented; the assent or belief seemed to come as agreement of this schema with that of previously accepted opinions. D 7a. Visual image of two parallel lines, at first in some large, vaguely seen plane in space, then on a page of the geometry I used to study. Visual image of the outside of the book, and verbal image: Wentworth. Verbal image: Euclid. In the image of the lines I seemed to see that they were just as far apart from one another in one place as in another. The lines as I saw them did not meet. My belief consisted of some perceived agreement between the statement on the paper and that of my geometry. I cannot remember anything in consciousness, except the visual imagery, that carried the belief. C 43a. Visual image of a mob in the street. At first identified as a scene in the Tale of Two Cities; then it changed to a scene in Felix Holt. When I say it was a scene in these books, I don't mean that I said the names of the books till I came to report. The scenes in either book seem like

independent things to my imagination, and I see them in their place and know what they are without any verbal image. Then visual image of Calkins' Psychology and memory, I think wholly visual, of a passage in it. Belief. This seems again to have been a perceived agreement between the sentence and my images.

The two last introspections have been given with some fullness, in order to remind the reader of the typically visual character of C's thinking. We proceed with descriptions of belief. F 4b. Visual image of a man hypnotising a subject by waving his hands before his face. As this seemed to fit into the schema for 'absence of any stimulation,' I believed the statement. I cannot describe this belief further than as a coinciding of the visual schemas. F 1ab. It is hard to define the difference between the certainty itself and the contents because they were so closely connected. The content came as a visual schema, and the certainty seemed to consist in the fact that it fitted a previous schema in my mind. I did not see the two separate at first and then coinciding; but there were no ragged edges; they coincided. C 14a. The belief was only slightly if at all verbal. It consisted of strong organic sensations and of what I can only describe as a perception that the schematic visual image produced by the reading fitted those already in the mind. I know that this description is not accurate. I do not mean that I first had the schema of my own opinions, and that the new schema then fitted into it, or that they were both there and moved into each other like the double images in stereoscopic vision. There was the one representation; but there was nothing outstanding that did not come under the statement. F 12ab. The belief here was expressed by a partial agreement with the schema of my ideas, and by a vague image of a book from which the statements were taken. This was especially clear in the second sentence, where the agreement was followed by the image of a book which I read last week and in which the ether is discussed. F 3ab. On reading first statement there were in consciousness only the verbal images of the words and a vague visual schema. There were the same in the second and, besides, a reference to Marbe's work on judgment. I think that this reference was visual, that is a visual image of the book and of the name Marbe as printed. There was also a vague visual schema of Marbe's conclusions, and outside this, below a straight line which separated the two, an image representing the Aufgabe. If the feeling of certainty was something distinct from the facts I have given I do not know how to describe it; I find nothing else. In the first there were no ragged edges in the visual schema; it seemed to fit my previous ideas. In the second, the Aufgabe below the line represented in some way an exception to the statement. D 1a. Belief came immediately, but it is hard to say in what form. It seemed to be what I call perceptual. I saw myself in the dreaming state and saw that that and my present state did not agree, just as I might see that the chair and the table are not the same thing without any explicit process by which I arrived at this conclusion.

C 36b. Visual representation of the two sentences at the opposite ends of a line; this meant: They are contradictory. C 31b. Visual image of some nerves, with the idea of a current passing along them; I think this was mainly visual too, in the form of undulations. Verbal ideas: Soul, and Electricity. Disbelief. This was mostly visual. It was a perception of the incongruity of the two; the visual images did not coincide. D 8b. (Disbelief.) I think it was mostly visual. My image of the elasticity of the brain-cells did not suffice for intelligence; did not cover it. There was a dark hazy halo round the outside which represented the rest of intelligence. C 41a. Verbal idea:

Perhaps not. This was accompanied by a vague visual image of an ill-defined dark mass which seemed to represent other possibilities not here considered. The meaning was that there were other things to be said; but this was not expressed in words. F 2a. Verbal idea: Dangerous. Visual images of something cut, but still mingled up again. In one way I believed, but in another way I did not believe. F 19b. Visual images, not only of the body itself, but of bodily processes. I had the contents of the sentence visually in mind, and I had visual images representing substance and power;—dark spots, very vague. The pictures seemed opposing; I did not believe; unpleasant affective tone. Then I had verbal ideas; just two or three words, I can't remember. Then the opposition of the images disappeared; they fitted together; and I believed the statement. F 8b. Mental contents were visual images. Belief consisted in their nearness together; there was also agreement with past schema. D 2ab. As between these two sentences, the first seemed much more definite and nearer. The image in the second was vague and very far away and inaccessible. The distance between it and myself seemed to offer an insuperable barrier, like the distance to the stars. With the first, though it was definite and near, there was a sort of background of doubt, a cloudy something that seemed to lead out in all directions and indicated that influences in human character are hard to measure. In reporting, this came to me verbally, but it was a visual image of a cloudy substance that seemed to radiate in wide, blunt strands in every direction from the central image.

(2) F 10b. Distinct visual images of the moon, and of living beings walking round on it. Verbal idea: Don't know. Then: If there are such beings, the telescope might reveal them. I think the last was not completely expressed in words, as here; it was partly visual; I seemed to see a telescope directed upon them. In these cases the visual images constitute the mental contents coming from the meaning of the statements, and the verbal ideas and visual agreement or non-agreement with the other schema constitute the feeling of certainty. C 24a. Visual image of a negro. . . . Then visual image of a professor of sociology. . . . His statement was clearly present in the form of visual images. . . . Neither belief nor disbelief on first reading; on second reading, verbal ideas: They are the same, meaning inborn difference and heredity. Noticed word: Social. No decision; feeling of confusion; sensations from breathing. Later disbelief, which came in the form of words; something like: All heredity is not social; though more scrappy.

Brief verbal images: Yes, No, Probably, Perhaps, Indefinite, Clear, Of course, On the whole, etc., were exceedingly frequent.

(3) F 1b. Belief. . . . Organic sensation from region of the diaphragm; I think, with the belief, though it may have come later. C 14a. Strong organic sensations from region of diaphragm and higher up in the lungs in connection with breathing. (Belief.) F 19a. Belief was just visual fitting; there was one image, and there was fitting; prevailing pleasure, and organic sensation in diaphragm. These all seemed to be mixed up together.

Reports of this sort were rare. The sensations from nodding were occasionally reported; never those of shaking the head. F 21a. Slight tendency to nod the head, and repeated nodding as I went on reading. F 6a. Very slight kinæsthetic image of nodding my head. This is the only fact that I can give as belonging to the assent.

(4) C 8a. Very strong disbelief. . . . Slight feeling of amusement and tendency to smile, with accompanying sensations from face. C 9b. Strong feeling of disbelief. . . . Feeling of amusement and tendency to

smile. F 19b. (Disbelief.) Unpleasant affective tone. F 15b. Black background with a mere chaos of figures and unpleasant affective tone. I don't know if the word No was present. . . . I think the disbelief was carried partly at least, in some of these cases, by verbal images and affective process. C 15a. (Belief.) Attitude of satisfaction. This was a pleasant feeling, with a tendency to proceed at once to introspection and not delay to consider the question. C 16b. Assent. . . . Present as a feeling of satisfaction and pleasure, accompanied by a visual schema. D 1b. The question was settled immediately. Belief; feeling of satisfaction; inhibition of further effort.

C characterised her beliefs as strong, weak, faint, definite, indefinite, sharp, clear, focalised. She made no such distinction between intensity and clearness as was drawn by *V*; possibly the difference in mental type may account for this difference.—The two first of the following reports were obtained by question from the experimenter; the third was volunteered by the observer.

C 4ab. The degree of belief was about the same in these two cases. There was some doubt in both; that is, there was a tendency to think of exceptions, which were partly visual, partly verbal in consciousness.—I can scarcely say that the nature of the beliefs was different psychologically. I thought verbally that *b* could be got from actual observation, while *a* must be more theoretical and a matter of individual opinion. But this, as a difference between the two beliefs, is a matter of logic rather than of psychology. It was present in consciousness, so far as it was present, in words. The conditions of belief in both cases included vague visual images. C 5ab. Belief slightly greater in *a* than in *b*. Here also the grounds of belief differed logically, and were expressed verbally (so far as present in consciousness). Verbal idea, like: Insufficient negative proof, in consciousness with *b*. C 15b. There was a difference between this belief and that of *a*. The latter was greater, but there seems to have been some qualitative difference which it is hard to describe, in psychological terms. That in *a* was more sharply defined, and decisive; that in *b* was broader and more vague. I believe that these terms apply to the background of organic sensations, but I am not sure.

Observer F

With this observer we made 184 tests. The analysis of belief-disbelief gave (1) verbal ideas, or sensations of kinæsthetic expression, or both of these factors together. Belief was characterised (2) by a peculiar organic sensation. (3) Affective processes are more frequent and stronger than in the first series of experiments. They are very variable, within the course of a single observation; on the whole, however, belief tends to be pleasant and disbelief unpleasant. They are often connected with a change of breathing.

(1) We begin with the verbal images. C 44b. Belief came at the first reading as No. That is, I believed the statement, but said No as negating a third mental element. F 2a. At the end of the first sentence I said No; I could feel the tone, so to speak, not like a mere kinæsthetic image, but like the actual sensation. Just exactly as if I

had actually said No. Sometimes No expresses belief and Yes disbelief. F 14a. At the end I said: No, these count (verbal-auditory image). The words: These count, stood for all that I had learned in ethics and philosophy. F 14b. I said Yes, with a sort of muscular set all over my trunk, especially along my sides. F 24b. As soon as I had finished reading I said: I don't know—I suppose so. Between the two there was a general emotional mood with a bodily set, meaning something like But. With the second term there was kinæsthetic image of a shrug of the shoulders; indifferent. The whole mood was a sort of acceptance. C 29b. Verbal No; complex of muscular and organic sensations that I should now interpret as: That's all nonsense. F 5b. Read, and said: Rheumatic babies (auditory-motor). There was nothing behind; that was the belief. I had had strains, particularly in shoulders and upper part of body in *a*, but I was relaxed when I came to *b*.—There were many cases in which a word, Yes or No, was the whole of the belief or disbelief consciousness.

F 3a. I said Yes to myself and nodded my head. C 31a. Belief came at once in a Yes, auditory-motor, with a muscular sensation in middle of back of neck. F 23a. Belief was kinæsthetic image or sensation; I don't know which. It was at centre of back of neck, very much like the sensation of nodding. C 1a. Tendency to nod my head. Had sensations (muscular) at back of neck. F 4b. Said No to myself, and actually shook my head.—Reports of this kind were very common.

(2) C 1b. Organic sensation when meaning was clear and belief came. . . Localised in the abdomen, a long narrow transverse and rather weak sensation. C 2b. Organic sensations, not localisable exactly. F 3a. Got usual organic sensations from abdomen.—These sensations never appeared with disbelief.

(3) F 7a. (Disbelief.) Rather unpleasant. . . While it was unpleasant, I had disturbance of breathing. F 10a. The verbal images, the sensations from change of breathing, and the unpleasantness seemed to make up a single complex. (Disbelief.) F 1b. Said: Of course; rather pleasant, with slight relaxation of breathing. F 2b. Said No; unpleasantness and breathing strain. Said Nonsense; had strains in arms and shoulders, and very definite set or bodily posture. Unpleasant. F 5b. Disbelief, quite sure, rather unpleasant. C 23b. Affective processes changed so often that I can hardly describe them, but disbelief was rather unpleasant, while belief was pleasant. F 13b. Said No; rather unpleasant. At the same time, organic sensations from breathing, such as I might have if I heard: You're a liar, only weaker. Weak muscular strain in chest.

Observer G

Only some 20 observations were made by this observer. We append a few characteristic introspections.

G 1ab. Consciousness mostly verbal. In reading first sentence, tendency, verbal and kinæsthetic, when I came to the word *goes*, to say: Does not go. . . After finishing second sentence, two tendencies, kinæsthetically to nod head, and verbal-motor as if to say: That's all right. I can't analyse the verbal tendency more. It was simply an innervation of the tongue, and sometimes larynx, to pronounce the first sound of each word. G 5b. Nodded to it and said Yes to it. G 7a. Verbal ideas: No, Bismarck is greater, Gladstone is greater; don't believe it. Only partly articulated; I wanted to whisper it. G 7b. Tendency to smile and to say: That is absurd. Tendency to smile consisted of strains in the face, especially around the eyes; with a flash there came a host of verbal ideas, in shorthand, about the dis-

turbance in the Orient; too complicated and vague to be analysed. G 12a. All I remember is a vague verbal tendency, meaning: At least business men believe it. This was very much abbreviated. G 5a. Host of verbal associations, abbreviated and condensed; one of these was a change of the sentence into: Drinking makes some of us happy. That too was abbreviated. Then there was a very vague, kinæsthetic and motor attitude, representing a woman of the total-abstainer kind, with disgust for drunkard, turning away her face and head and wrinkling her forehead: these things seemed to occur in my own case (feeling of disgust, tendency to turn head and wrinkle forehead). There were words in this too. [This empathic kinæsthesia is rarely reported by G.] G 12b. Very vague sort of visual image of grocery store on College Avenue, with vague square show window; vague image of clerk with long apron. Tendency to smile, with kinæsthetic and motor attitude as if I was buying in that store.

METHOD OF PAIRED COMPARISONS: MATHEMATICAL EXPRESSIONS, VISUAL

We introduced two modifications into the procedure of the introspective method. The one of these was that we asked the observers, at the conclusion of the principal series of experiments, if they could suggest any further work that might throw additional light upon the nature of the belief-disbelief consciousness. The observer C, in response to this question, suggested that a short series be taken, by the method of paired comparisons, with mathematical expressions instead of sentences.

Observer C

The observer gave 50 observations. (1) The certainty-uncertainty consciousness was strongly affective; certainty was pleasant, uncertainty unpleasant. (2) Kinæsthetic sensations are present in many cases, though they are not prominent features of the records. (3) The most important thing is a visual perception of agreement or disagreement, which is (4) clinched and expressed by words.

(1) G 25a. Felt quite certain. Satisfaction. G 26a. I was quite certain; pleasantness was contained in it. G 42b. I had vague schematic image of possibility of making a mistake, and it was very unpleasant. G 43b. Frowned; it was very unpleasant . . . I got the feeling of uncertainty; unpleasantness. G 41b. Very easy and pleasant.

(2) G 32a. Certainty . . . Relaxation of muscles; sat back. G 34a. Dissatisfaction and unpleasantness; restlessness, and general muscular strain. G 41a. Tension of muscles. (Uncertainty.) G 41b. Feeling of relaxation. G 43b. Strain in hands and upper part of body . . . I got the result; nodded.

(3) G 40b. Since the number was so large, and contained so many terms, I always forgot the preceding images when I came to the next stage . . . Lack of clearness; this was simply confused images of a lot of numbers. Also very vague schematic images of those places where I might have made a mistake. G 25a. Visual images were very plain; clear cut. I could see it was right. Everything was very clear visually; the numbers were at their right places on the scale. G 26a.

Certainty was caused by clear visual image; there was no overlapping. Saw number-scale for numbers higher than 100. G 42b. Tendency to try it over again, that is, to start in again. When I had another answer, I had both answers in clear visual images; but they looked entirely different. I can only say that the one looked as if it fitted. [The observer remarked, G 30a: I don't know how to describe the tendency to repeat, to start over again. It is anyhow partly visual. Very vague visual image of possibility of getting another answer. It is too vague to describe. There seems to be kinæsthesia behind it. G 43b. Strain in hands and upper part of body, which composed the tendency to do it over again. Sometimes this set was more prominent, sometimes the images were prominent; vague visual schema of chance of mistakes; a big confused mass with everything mixed up.]

(4) G 42b. Here images were so fleeting that I could not use them; I did not feel sure at all. Hence I worked both visually and verbally. G 43b. I said the numbers to myself. G 40b. Performed partly visually and partly verbally. G 32a. Clear images, visual and verbal. G 24a. Idea that I might have forgotten, might have been mistaken (partly verbal; also visual image of something that had a blank space).

EXPERIMENTS WITH TONES

At the request of the observer *F*, we made a series of 50 experiments as follows. The experimenter took two tuning-forks, of 256 and 260 vs. respectively, and after a signal struck in succession either the two forks (A-B or B-A) or the same fork twice over (A-A or B-B). Having struck the forks, he pronounced the word Same or Different, irrespectively of the actual relations of the tones. The observer was to react to this judgment expressed by the experimenter, by way of acceptance or rejection, and was to give an introspective account of his consciousness.

The introspections were complicated by the kinæsthetic attitude of expectation. As regards agreement and disagreement, we find (1) that, almost without exception, *F* has verbal ideas: Yes; No; Yes, same; No, same; Yes, different; No, different, etc. (2) Further, in the majority of the reports there is nodding or shaking of the head, actual or imaginal. (3) The affective accompaniment is marked: agreement is always pleasant, disagreement always unpleasant.

As these results simply confirm the previous analyses, we do not print extracts from the introspections.

FINAL INTERROGATION OF OBSERVERS

The second modification of the method that we introduced is that, at the conclusion of the whole investigation, the experimenter reduced the introspections to a single formula, which was laid before the observer for approval or disapproval. We regard this procedure—a sort of procedure by confrontation—as important in work of the kind here reported. The experimenter amasses a great bulk of introspective material, which he has to sort, evaluate and arrange, and from which he

has to draw psychological conclusions. By rights, perhaps, the whole of this material should be printed as an appendix to his paper; but no Journal has space for it. There is always a risk, then, that the experimenter put upon the records an interpretation which is not shared by the observers themselves: witness the classical instance of Bühler and Dürr. If, however, he read to the observer, when the work is completed, his digest of the reports dictated, then the observer has an opportunity to say his say independently; he can declare his agreement or disagreement with the conclusions. His approval must greatly fortify the whole argument of the paper; his disagreement should lead to further study of the consciousness in question.

Our observers did not know beforehand that this method would be followed; but all of them expressed their approbation of it when it was actually employed. We proceed to the details.

Observer V

The experimenter read to the observer the following summary statement. "For the observer *V*, belief-disbelief is characterised by fairly strong affective processes, which tend towards pleasantness. The affective process accompanies a characteristic kinæsthetic-organic complex, which forms the core of the belief-disbelief consciousness; if a single name is to be given to this complex, we may term it a 'feeling of power' or 'of aggressiveness.' Verbal ideas are rare in the consciousness; the contents of the belief are usually visualised. In the case of certainty-uncertainty, we find the same type of consciousness, except that certainty is pleasant and uncertainty unpleasant." The observer unhesitatingly accepted this analysis.

The experimenter then asked whether *V* had ever come across anything in the way of an imageless content, either in belief-disbelief, or in any other consciousness accidentally aroused during the course of the experiment. The answer was negative.

The observer was then asked how she distinguished, psychologically, belief from disbelief. She replied: "I don't know, except that my feeling of power means sometimes arguing for and sometimes arguing against. Perhaps a variation of the method would bring out some difference in the feeling itself, but I don't think so. I was working under the alternative Aufgabe, belief or disbelief; the consciousnesses seemed to be alike, but their meaning was different."

Observer C

The experimenter read to the observer the following summary statement. "For the observer *C* the belief-disbelief con-

consciousness is not a markedly affective experience; in general, belief tends towards pleasantness, disbelief towards unpleasantness. Nor are there pronounced kinæsthetic-organic components, although these sensations may appear and may be integral to the consciousness. The core of belief-disbelief is to be sought in the arrangement and behavior of visual images, which represent both the materials of belief and the pre-existing mental furniture. The visual images are often supplemented by verbal ideas, in which also the belief-disbelief consciousness reaches its terminus. In the case of certainty-uncertainty, consciousness is more strongly affective (certainty being pleasant, uncertainty unpleasant), and the kinæsthetic-organic sensations are more in evidence." The observer accepted this analysis.

The experimenter then asked whether *C* had ever noted anything like an imageless content. The answer was negative, though *C* said that there were many attitudes that she had not been able to analyse, under the conditions and with the time at her disposal; some of these, she remarked, had been analysed by other observers in the work which she herself was conducting. [This work is a general study of the Conscious Attitude.]

Since belief and disbelief had been sufficiently distinguished in the introspective reports, by the characteristics of the visual imagery, no question was asked concerning their discrimination

Observer G

The experimenter read to the observer the following summary statement. "For the observer *G*, belief-disbelief is characterised by moderately strong affective processes, which are normally pleasant for belief and unpleasant for disbelief. The core of the consciousness is constituted of verbal ideas, some of which represent habitual verbal reactions, and others of which are more complicated; these latter are given in a peculiar abbreviated form. There is evidence of kinæsthetic sensation, though this is oftentimes not at all prominent in consciousness; there are occasional visual and auditory images; but, essentially, the whole consciousness is verbal."

The observer accepted this analysis, with a reservation which did away with any necessity for a question regarding the occurrence of imageless thought. He said that the analysis was complete, so far as it went; he found no other contents, imaginal or imageless. But he declared his conviction that belief-disbelief was a course, a mode of conscious processes, specifically determined by the *Aufgabe*; and he added that analysis would not be complete if reference to this pattern or mode of occurrence was omitted.

We are here in presence of a very difficult psychological prob-

lem. We met it also in the early stages of *C*'s introspections, though as time went on *C* laid greater emphasis on the spatial arrangement and mutual relations of her visual images, and less upon the belief-meaning which the separate images seemed earlier to embody. Something of the same sort appears in Ach's sensations of intended movement; sensations of intended finger-movement, it will be remembered, might occur in the eyes. We have already mentioned Störing's state of assurance. Titchener gives an instance of recognition, performed under instruction without a trace of any specific contents (*Thought-processes*, 1909, 179 f., 289 f.). Ach speaks in the same way of volition (*Willens-tätigkeit*, 195, 231; cf. Messer, in *Arch. f. d. ges. Psych.*, viii., 1906, 199 ff.). We need not multiply instances. It seems clear that a certain meaning—intention, recognition, assurance, volition, belief—may be bound up with, incorporated in, a sequence of mental processes which proceed under determination, though there is nothing specific in these processes to serve as the psychological vehicle of that meaning. They go on in a certain way, under the instructions given; and their going on in that way constitutes them will, recognition, belief, etc.

This position, we may add, was several times discussed by the observer *G* and the experimenter, and was accepted by the observer without reservation. It seems especially important to note that *G* finds no trace of imageless contents, since he is precisely of what has been described as the imageless type.

Observer F

The experimenter read to the observer the following summary statement. "For the observer *F*, belief-disbelief is not a markedly affective consciousness, though under certain circumstances the affective processes may be moderately strong; the affective reaction is very variable, but normally belief tends to pleasantness, disbelief to unpleasantness. The core of the consciousness consists in the verbal ideas Yes and No, or their equivalents, and in the kinæsthetic sensations aroused by the gesture of nodding and shaking the head. A special organic complex is a frequent component of the belief-consciousness. Oftentimes there is a general kinæsthetic reaction, in which sensations from breathing are perhaps most prominent." This analysis was unhesitatingly accepted by the observer.

The experimenter asked whether *F* had found any trace of an imageless content, and the answer was negative.

CONCLUSION

We may sum up the results of the present enquiry as follows:

(1) The belief-disbelief consciousness, in any form more pronounced than a quasi-mechanical acceptance or rejection, is not of common occurrence in everyday life, and at first is not of common occurrence under experimental conditions. If the instruction is given to observe and report upon this consciousness, however, it appears fairly regularly in response to fitting stimulation.

(2) The belief-disbelief consciousness is not necessarily or regularly an emotional consciousness. Whether or not it is markedly affective in character depends upon the individual constitution of the observer.

(3) The belief-disbelief consciousness may be a straightforward experience, given, *e. g.*, in terms of a general kinæsthetic attitude, or of internal speech and localised kinæsthesis, or of the mutual relations of visual images; or it may be bound up with, incorporated in, a particular consciousness, verbal or visual. In the former case, the contents come to the observer as being, specifically, belief; in the latter case they come to him as the vehicle of belief, which itself finds conscious representation only in the course or mode of occurrence of the contents.

(4) Belief and disbelief are consciousnesses of the same kind.

(5) The certainty-uncertainty consciousness closely resembles that of belief-disbelief, but is in general more strongly affective. Certainty is pleasant; uncertainty, doubt, is unpleasant.

(6) We have supplemented the *Ausfragemethode* in two ways: first, by asking the observers, on the conclusion of the principal experiments, themselves to suggest materials and method for the continued investigation of the belief-disbelief consciousness; and secondly by confronting the observers, at the conclusion of the whole work, with a summary digest of their introspective reports. The first of these supplements served only to confirm our previous conclusions, but it is fair to add that the limits of time forbade us to use it to its fullest extent. The second gave valuable testimony to the correctness of the interpretation put upon the introspections by the experimenter.

APPENDIX

It is clear that the above conclusions hold, primarily, only under the conditions of our experiments. It is therefore important that the reader should know what sort of stimulus-material we employed. We had at first intended to print the sentence or mathematical expression at the head of every piece of quoted introspection. But we found that this procedure would extend our study to an unprintable length. As we did not wish to curtail the introspective evidence—already given only in sample—we were obliged to omit the stimuli; and we now must content ourselves with giving, in this Appendix, a few instances of the sentences, etc., employed.

Single Exposures. Since the whole world, as it exists for an individual consciousness, whether from a practical, theoretical, or æsthetical point of view, has come so to exist through prior mental process, it may be said that there is no objective fact which is not capable of being utilised by the psychologist.

We may say that the elementary or root-function in feeling is susceptibility to pleasure and pain.

Blessed are the meek, for they shall inherit the earth. Blessed are they which do hunger and thirst after righteousness, for they shall be filled. Blessed are the merciful, for they shall obtain mercy. Blessed are the pure in heart, for they shall see God.

The earthquake in Italy caused the death of 200,000 persons.

Wundt published the first edition of his *Physiologische Psychologie* in 1876.

In general, negroes have less power of grasping and exerting pressure than white men; intelligent persons have more power than persons of low intelligence.

The influence of women in all social matters is very great; our present civilisation may be traced to the contributions of women.

That the creature knows its proper food, and may be determined in its knowledge of it by previous impressions, is regarded as the first and primal indication of the presence of mental life.

Education is, in the last resort, a sort of hypnotism.

A hawk in South America could tell the time; it went every day to the monastery at the precise hour when food was distributed to the poor.

There have been many reformers, but none more radical than Rousseau; for he advocated the overthrow of civilisation and the return to a state of nature.

In truth, it was not language that generated the intellect; it is the intellect that formerly invented language; and even now the newborn child brings with him into the world far more intellect than talent for language.

Moral instruction should touch the hearts of the pupils.

Though we may by a device of abstraction distinguish between a mental process and its results, a producing operation and its product, we must remember that these are only two aspects of the same phenomenon.

In the heat of battle a man may be wounded and, for a time, be wholly insensible of his pain, because the intense engagement of the system—both brain and muscles—precludes the diffusion of impulses in the usual channels.

Urteile sind Bewusstseinsvorgänge auf welche die Prädikate richtig oder falsch eine sinngemässe Anwendung finden.

Coeducation is one of the best means for elevating the character of our boys and girls.

A can do a piece of work in 5 days, *B* can do it in 4 days. How long will it take *A* and *B* to do the work together? Answer: 2 2-9 days.

$$897 + 789 + 987 = 2673$$

$$42a^3 - 30a^2x = 6a^2$$

$$35ax^2 - 25x^3 = 5x^2$$

Paired exposures. (a) Man is the creator of God. (b) Living men can communicate with the spirits of the dead.

(a) Even the purest well-water contains eleven million bacteria to the cubic inch. (b) The people on Mercury are trying to attract our attention by intense light-signals.

(a) Within fifty years we shall see the establishment of a democratic form of government in Russia. (b) Newton saw the law of gravitation in the fall of an apple.

(a) Parallel lines, however far produced, never meet. (b) Judgment is only a train of fluctuating ideas ending in a clear and steady idea.

(a) Our capacity of memory is determined by the number of cells

in our cerebrum. (*b*) Too great freedom of marriage means too great ease of divorce.

(*a*) Clear ideas are not necessarily persistent ideas. (*b*) There is no inborn difference between the different races; the existing differences are due to social heredity.

(*a*) Take alcohol out of human life, and the number of criminals will be greatly decreased. (*b*) Children love their parents for the pleasure they provide for them.

(*a*) There are but few cases in which desire is not accompanied by pain. (*b*) Examine the desires in your mind at this present moment, and you will find little else than pleasure.

(*a*) If there were no attraction between the earth and the sun, the mechanical pressure of light, thrown upon the whole surface of the earth, would drive it away with enormous rapidity. (*b*) Light is the vibration of the omnipresent ether.

(*a*) Corsets that embrace the waist with a grip that tightens respiration into pain, and skirts that weight the hip with heavier than maternal burdens, cause grievous maladies. (*b*) Clever children delight in acquiring knowledge, and feel pride in outstripping their competitors; but they must be restrained in their activity, more especially as it too often happens that mental precocity is associated with feeble bodily powers.